

Risk Factors for non-fatal fall injuries at home among adults 25 to 60 years

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Executive summary

Unintentional falls account for a significant burden of injury among all age groups in New Zealand. Falls are the leading cause of injury hospitalisation and one of the three leading causes of injury death in New Zealand. Home is the most common location for injury morbidity. The impact of falls at home among working-aged people may have significant implications for both work productivity and family life. This project was designed to identify modifiable risk factors for unintentional falls at home resulting in admission to hospital among adults aged 25 to 60 years (defined as 'working-aged' for the purpose of this report).

The project involved the following methodologies focusing on the falls and age group of interest: a review of the published literature to establish the epidemiology of the burden of these injuries; an analysis of routinely collected national data on hospitalisations and deaths; an overview of known risk factors and a systematic review of the epidemiological evidence for a causal role of acute or chronic alcohol use; and the Auckland Falls Study a population-based case-control study to identify modifiable risk factors for the injuries of interest among working aged people.

The cases in the Auckland Falls Study were individuals aged 25 to 60 years involved in a fall-related injury at home in the Auckland region resulting in a death or admission to hospital over a 12-month study period commencing in July 2005. They were identified through surveillance of hospitals and the Coroner's office. Controls were randomly selected from the electoral rolls for the Auckland regional Council constituency (this included people of both the Māori and General rolls) from the same age group as the cases. An interview-administered questionnaire collected data on a range of known and postulated risk factors for falls. Information was also collected on a range of potential confounders in order to control for these in analyses.

Main Findings

The review of the international literature regarding the epidemiology of falls, confirmed that this mechanism of injury in the home setting accounts for a significant burden of morbidity and mortality in this age group. Unintentional falls among people aged 15 to 44 years are the second leading cause of unintentional injury *disability-adjusted life years* (DALYs) across the world. Some gender differences exist in incidence within specific age groups, and for some types of falls. There is limited international data regarding the specific location and context of falls occurring within the home, or the longer-term outcomes following related injury.

Results of the review of routinely collected New Zealand injury morbidity and mortality data identified that at least one fifth of unintentional falls resulting in inpatient admission or death among this age group occurs at home. However this is likely to be an underestimate due to the number of cases where the place of fall was not specified (31% of hospitalisations and 15% of fatal, unintentional falls). For every fall-related death there were approximately 150 in-patient admissions. A steady increase in rates of injury was noted from about 45 years of age onwards. Males experienced higher rates of fatal falls than females, with the reverse pattern seen with hospitalisations.

The risk factor review noted that in contrast to the large body of literature relating to older adults, there is limited information regarding the prevalence and contribution of potential risk factors for falls at home among working-aged adults. Overseas studies suggest that the use of alcohol, prescribed hypnotics or sedatives, physical disability, and high levels of physical activity increase the risk of fall-injury.

One hundred and six research reports were identified in the systematic review of the literature relating to the role of alcohol in falls among people of working-age. Approximately 50 were appraised but only 10 fulfilled the inclusion criteria. Five studies investigated the effect of acute alcohol consumption, on fall risk, and eight investigated usual alcohol use. Although almost all the studies

indicated that alcohol contributed to falls, causal relationships could not be established due to the methodological limitations of these studies.

The Auckland Falls Study recruited 335 cases (97.4% response) and 352 controls (64.2% response). There was as a strong and consistent relationship after controlling for the effects of potential confounders between the following factors and the risk of an unintentional fall at home resulting in admission to hospital or a death among working-aged people:

- Two or more prescribed medications (OR=2.45; 95% CI 1.25-4.81)
- Not having sufficient regular exercise (OR=2.08; 95% CI 1.40-3.09)
- Drinking in the previous 6-hours:
 - 1 drink cf. no drinks (OR=1.40; 95% CI 0.58-3.34)
 - 2 drinks cf. no drinks (OR=3.66; 95% CI 1.23-10.85)
 - 3 or more drinks cf. no drinks (OR=12.85; 95% CI 5.19-31.82)

In contrast, sleep for less than five hours (in the previous 24), cigarette smoking and marijuana use within the preceding three hours were not significantly associated with the risk of fall-related injury, when the effects were controlled for confounding and other relevant factors.

Conclusions

Acute alcohol consumption, not having sufficient regular exercise, and taking two or more prescribed medications are associated with an increase in risk of fall-injury at home among working-aged people in this regional population. Reduction in exposure to these risk factors could reduce the burden associated with these injuries.

Appropriately designed studies with sufficiently large sample sizes are required to address some specific issues identified by this project, including:

- Expansion of the age group of interest to 15 to 64 years
- Recruitment of participants from a range of geographic locations in New Zealand including rural and urban areas, as well as a sufficiently large sample of Māori participants to examine issues of relevance.

- Examination of the relationship between acute and chronic sleepiness, patterns of drinking, and the relationship between sleepiness and alcohol exposure
- Investigation of the relationship between disability and falls, and particular issues around the use of wheelchairs and other mobility aids
- In depth examination of the relationship between prescription medication use and fall-injury risk, including types of medications or patterns of use that increase risk
- The capture of exposure information on environmental features such as stairs, bath and shower usage
- Investigation of risk factors for specific types of falls e.g. ladders, stairs

The characteristics and context of falls coded in NZHIS data as occurring in “unspecified places” need to be investigated in order to establish the true burden of falls at home and to identify potential improvements in coding practices to better capture the settings of falls and other injuries.

Interventions aimed at reducing the harmful use of alcohol and increasing regular physical exercise among people of working-age should be developed to reduce the incidence and associated morbidity and mortality from unintentional falls at home. Consideration needs to be given to the appropriateness of existing and the development of new fall-injury prevention activities to commence in middle-age, rather than the current practice of an older-age focus.

Consideration should be given to widening the scope of research activities and injury control efforts to reduce the burden of injury associated with falls among people of working-age to incorporate other settings such as the workplace where there may be important parallels or similarities with regard to risk factors.

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